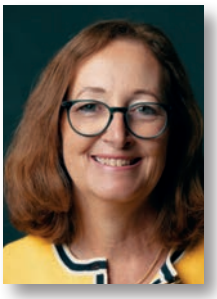
# Creating platforms for productivity

Interview with Fiona Marshall, President Novartis Biomedical Research. The interview was conducted by Goran Mijuk.



**Fiona Marshall**
**President, Biomedical Research**

The shores of Dorset with their magnificent sea-washed white cliffs were the playground of Fiona Marshall, imbuing her with a deep fascination for discovery and science from an early age. This feeling only intensified as her career progressed, during which she developed a practical approach to science and never saw a conflict between academia and industry.

"I loved exploring along the beach, trying to understand nature, geology, and evolution. All this led me, as quite a young child, into different scientific areas, particularly biology. It was there in front of me as a child," Marshall said when we met for an extended interview in the late spring of 2024 on the Novartis Campus.

She was an inquisitive child, Marshall remembers, permanently poking her parents with questions as to why things are the way they are. This curiosity remained a mainstay of her character and inspired her to study biochemistry at the University of Bath and continue to delve deep into neuroscience at the University of Cambridge, where she did her Ph.D.

But while her wonder for discovery seemed bottomless, she also cultivated a practical mind – maybe sharpened during her long walks along the beach where she would touch and feel the washed-out shells of the limestone cliffs and wonder how these shapes had evolved over the millennia.

"I loved to observe the smallest detail, as sometimes the small things are the most interesting. And I think that's what I found interesting in science, to look at what is going on at the microscopic level. And seeing it at that very high resolution is something that I found fascinating throughout my life," she said.

Maybe for this reason, she cultivated a mindset that kept a balance between the abstractions of basic science and the practicality of applying these insights to a product. Already during her studies, she chose a "sandwich course," which allowed her to spend part of her time working at a pharmaceutical company.

During her first stint as an undergraduate, she worked at an animal health company, focusing on anti-parasitic agents. The second placement gave her a sneak view into a biotech company. This convinced her that industry was the path to follow, prompting her to pursue her Ph.D. degree as part of an industry-sponsored program that gave her the opportunity to work in both worlds.

"It's what we call a CASE Award. It's an industry academic award. I had two supervisors. One was at Cambridge University while the other one was in the company. And so, I split my time between the company laboratories and the academic laboratories," Marshall explained, adding that after completing her studies she immediately joined the pharmaceutical industry.

Her fascination with working on the development of novel treatments, however, did not mean that she would forgo basic science. "I've always tried to do fundamental research, even within industry, and make discoveries, try and invent things, and publish the work. So, I've also had an academic career, but within industry."

She recommends this balancing act to her colleagues too. "I very much encourage all my teams to publish science, to do great science. Because I really believe that the quality of the research we do in industry is as high as in any academic institute, and maybe even higher for the ability of multidisciplinary teams to collaborate on complex problems," she said.

Almost from the start of her professional career, her inquisitive spirit prompted her to zero in on G protein-coupled receptors, or GPCRs, to which hormones and neurotransmitters such as adrenaline and dopamine bind. Besides working on answering some fundamental questions, she also set up a biotech company, Heptares Therapeutics, which focused on these proteins.

"I developed my expertise in this field and published a lot of papers. That's how I got an academic reputation, if you like, through publications on this one family. At the same time, we also started to work on using these insights to develop new treatments at Heptares, coming from our deep understanding of the proteins themselves."

Later, she would hone her research skills and work towards setting up a successful research engine by merging disease area and platform expertise. "The best and most successful research operations in pharma are companies where you get this balance and blending of the deep disease area expertise with the platform technology excellence coming together," she said.

This, she said, is what she is driving at Novartis Biomedical Research, which with its five key technology platforms and focus on four therapeutic areas is destined to remain a leader in the research space.

TO THE INTERVIEW

**Dr. Marshall, when you arrived at Novartis in 2022, the company was in a big transformation. One of the tasks you faced was bringing the research, development, and commercial operations closer together. How has this transition evolved?**

FIONA MARSHALL: It has worked very well because there are strong reasons as to why you want the key functions to be involved at an early stage when it comes to developing innovative treatments. As a researcher, you need input from market and clinical experts right from the beginning to understand the commercial dimension. Anyone who's developing any sort of product would do that. These insights help researchers design the molecule in the first place. Unless you have that input from commercial and development, you can't design the best medicines. In the past, research groups that have worked in isolation have come up with lots of ideas, but they often failed to translate these insights into marketable therapies. The new model is helping to change this.

**How did people react to this change?**

My research teams have readily embraced the new model and are very excited that they can work closely together with their development and commercial colleagues as a team. In these groups, which include researchers, translational medicine experts, clinicians, and commercial experts, among many others, participants think about new concepts and how these fit into the overall Novartis

strategy. Also, in this model, our researchers are now encouraged to think about the patients and their unmet needs early on and deeply understand the disease area and find the right technology platform to work on new medicines.

**Does this collaborative model risk undermining freedom of research?**

This is not what the model is about. The collaboration is about setting a clear framework and giving researchers a much more holistic view of the area in which they work. Our commercial and clinical colleagues give us a picture of what the market opportunities are. And that's very helpful to us. Although we may not always agree with their perspectives, as we might have our own ideas about unmet needs, we can have a discussion. Our recent breakthrough in the renal disease area is an example of how we can drive a strong scientific idea to the point of building a new therapeutic area in which we were not active before.

**What about external collaborations?**

I have increased our budget for collaborations, particularly focusing on academic partnerships through a centralized fund. This allows different disease areas within our organization to access matched funding, facilitating collaborations with academic researchers on topics of mutual interest. This approach, which proved invaluable in my own career, aims to further stimulate such collaborative ventures. Furthermore, we are committed to driving internal projects such as Genesis Labs and are encouraging the inclusion of students, interns, and post-doctoral fellows, providing them with practical experience in our operations. Another significant development this year is the relocation of the Friedrich Miescher Institute (FMI) to our Campus in Basel, which further enhances our collaborative efforts.

**Can you share some details on the FMI?**

The FMI is now aligning more closely with our interests, shifting their focus from model organisms to more directly relevant areas such as human biology, human cell systems, and organoids. This shift has significantly strengthened our areas for collaboration, particularly in the innovative use of organoids – miniature, simplified versions of organs.

**Having founded a biotech company and having worked in pharma, how do you tackle the challenge of infusing agility into a large organization such as Novartis?**

There's a perception that big pharma operates much like an oil tanker – moving slowly and taking a long time to change direction. Conversely, a biotech functions more like a speedboat – nimble, quick, and able to change course effortlessly. However, neither extreme is ideal. While a speedboat can maneuver quickly, it lacks the endurance for long journeys and may soon run out of fuel. On the other hand, the oil tanker, despite its slow pace, has the durability and capacity necessary for long voyages. In the pharmaceutical industry, we aim to find a balance between these two extremes. We leverage our deep expertise and robust infrastructure to endure the lengthy process from discovery to medicine, which can span a decade. This journey requires significant dedication and resilience. Often, biotech companies initiate drug developments but seek the partnership of larger pharma companies to complete the journey to the market.

**And how do you drive innovation?**

To encourage innovation, you must give scientists some degree of freedom to go and invent things, and to be bold, and reimagine medicine. You shouldn't

control everything. Just give people that space to be creative and be a pioneer in the areas you choose to excel. Novartis has been very good at this in areas such as gene therapy and siRNA-based treatments, to name two examples. However, to excel in our domains, we need to collaborate with our colleagues from development and commercial and at the same time go deeper and stay focused on our chosen areas.

**Can you expand on this?**

One crucial aspect of research is the need to deepen our engagement in specific areas rather than hopping from one project to another. There is a common tendency among scientists to chase the next new idea, always attracted to novel concepts. To counter this, I have emphasized developing what I term "platforms for productivity." This approach involves staying committed to a particular platform, and leveraging and expanding our expertise repeatedly. By doing so, we not only enhance our proficiency but also amplify our success. This disciplined focus allows us to learn from initial efforts and continuously improve, ultimately leading to a robust portfolio from which multiple medicines can be developed, not just a single solution.

**Does this also include working with external partners?**

Maintaining a robust internal research group is vital because these scientists continually engage with the global scientific community by reading the literature, attending conferences, and networking with peers. This ongoing interaction is crucial as, despite our expertise, our organization represents just a small fraction of the world's scientific talent. We must always be on the lookout for external innovations that complement our work. Merging these can create substantial value. Occasionally, we will license projects that align with our internal research because our deep expertise helps us recognize external opportunities that might outperform our developments or offer strategic advantages.

**Would you say that external innovation is not so much to be feared as a competition but to be understood as enhancing the unique ability of Novartis to carve out a leading space in its chosen fields?**

Yes, I believe it's important not to view everything as competition; rather, it's all complementary. The interplay between our business development function and research is where true value and synergy emerge. Occasionally, we integrate external innovations and may even halt our internal programs if the incoming solution proves superior. When this happens, the team originally working on the internal project can shift their focus and expertise to the newly licensed initiative, enhancing our overall effectiveness and efficiency.

**Can you also expand a bit on the efforts in the artificial intelligence space?**

One exciting development in pharma, particularly at Novartis, is our use of AI to accelerate processes. With AI, we can rapidly analyze data and simulate experiments that previously would have taken much longer. Effective AI training requires extensive data, and our advantage lies in our vast repository of historical data, which we have compiled in our data42 platform.

**Has data42 made progress?**

We are now actively utilizing data42, which was one of the key reasons I was excited to join Novartis. I had heard about this initiative even before my arrival, and upon joining, I immediately sought to learn more about it. Despite the considerable effort previously invested in gathering this data, it was underused at

the time when I arrived. It was agreed that the oversight of this platform should be moved to Biomedical Research and we are now increasing our investment in data42.

**In which areas have you seen the first results?**

We're now not only incorporating clinical data but also adding preclinical safety data into the database. We've significantly broadened access to data42, enhancing its utility across various teams. Both our research teams and real-world evidence groups are now regular users, providing positive feedback. This expanded access has already yielded exciting use cases. For instance, we're now able to correlate preclinical toxicity signals with clinical outcomes, enhancing our understanding of potential safety issues. This insight allows us to retrospectively analyze if any preclinical signs could have predicted clinical safety issues, thus improving our predictive capabilities, and preventing similar issues with future molecules.

**Looking ahead, where do you see the biggest potential for Novartis to make an impact?**

The new technologies available today enable us to fundamentally alter human biology. Previously, treatments largely consisted of low-molecular-weight compounds that primarily addressed the symptoms rather than the underlying causes of diseases. Now, we have the tools to gain a deeper understanding of these underlying causes or mechanisms. For instance, human genetics can provide extensive insights into biological processes. This enhanced study of human physiology allows us to delve into the pathways that drive diseases, rather than merely managing symptoms. This advanced approach enables us to treat diseases in radically new ways, aiming not just for management but for long-term remission or even cure, which remains challenging with traditional small-molecule treatments. Modern methods such as gene therapy, antibody cell therapy, and siRNA allow us to enter cells and inhibit the production of proteins that may be driving diseases. This shift places us in a unique position to modify human biology and treat diseases in ways that are potentially more effective and beneficial for patients over the long term.